



Translation

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PEB359	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/JP2003/008605	International filing date (day/month/year) 07 July 2003 (07.07.2003)	Priority date (day/month/year) 12 July 2002 (12.07.2002)
International Patent Classification (IPC) or national classification and IPC F04D 29/18, 29/66		
Applicant EBARA CORPORATION		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 21 November 2003 (21.11.2003)	Date of completion of this report 15 March 2004 (15.03.2004)
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP2003/008605

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☐ the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statement under Article 19
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the drawings:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item. These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-4	YES
	Claims		NO
Inventive step (IS)	Claims	2-3	YES
	Claims	1, 4	NO
Industrial applicability (IA)	Claims	1-4	YES
	Claims		NO

2. Citations and explanations

Document 1: JP, 1-178800, A (TORISHIMA PUMP MFG. CO., LTD.), 14 July 1989
 Document 2: JP, 2000-314390, A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.), 14 November 2000

The subject matter of claim 1 does not involve an inventive step on account of documents 1-2 cited in the ISR.

Document 1, page 1, lower right column, lines 11-13 pertains to the blade inlet angle of an inducer blade, and discloses determining this utilizing a speed three-angle model that assumes non-impact inflow.

Also, paragraph [0022] of document 2 says that an axial flow blade 121 is an inducer, and paragraph [0023] discloses that the designed inflow angle of the axial flow blade 121 is set so that the optimum inflow angle is achieved at rated operation.

The angle at non-impact inflow in document 1 and the optimum inflow angle of document 2 are essentially the same as the inlet flow angle of claim 1, so constituting the angle of the blade front edge of an inducer so that it is essentially the same as the inlet flow angle at the design point flow rate would be easy for a person skilled in the art

The subject matter of claim 2 is not described in any of the documents cited in the ISR and is non-obvious to a person skilled in the art, so it is novel and involves an inventive step.

In particular, none of the documents describes or suggests the point regarding the blade angle distribution at the tip from the blade front edge to the blade rear edge that upstream from the vicinity of the throat the decrease percentage of the blade angle increases toward the blade front edge compared to downstream from the vicinity of the throat, and up to near a distance of 0.9 from the vicinity of the throat in the dimensionless flow direction the blade angle change percentage becomes small compared to upstream from the vicinity of the throat.

The subject matter of claim 3 is not described in any of the documents cited in the ISR and is non-obvious to a person skilled in the art, so it is novel and involves an inventive step.

In particular, none of the documents describes or suggests the point that the blade angle distribution at the hub from the blade front edge to the blade rear edge has a curved point in the vicinity of the throat, that the blade angle change percentage becomes small upstream from the throat, and that the blade angle increase percentage becomes large in the flow direction downstream from the throat.

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of Box V:

The subject matter of claim 4 does not involve an inventive step on account of documents 1-2 cited in the ISR.

Fig. 1 of document 1 and Fig. 1 of document 2 show disposing an inducer upstream from a impeller in order to make the inducer's axis coincide with the impeller's axis.

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International Application No.

PCT/JP03/08605

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of Box I:

Patent claims 1 and 3 in the amendment submitted with the letter dated March 3, 2004, are as follows.

"1. A inducer disposed upstream of a main impeller, wherein the blade angle distribution at said tip from the blade front edge to the blade rear edge is such that upstream from the vicinity of the throat the decrease percentage of said blade angle increases toward said blade front edge compared to downstream from the vicinity of the throat, and up to near a distance of 0.9 from the vicinity of the throat in the dimensionless flow direction said blade angle change percentage becomes small compared to upstream from the vicinity of said throat."

"3. An inducer according to claim 1, wherein the blade angle distribution at said hub from the blade front edge to the blade rear edge has a curved point in the vicinity of the throat, said blade angle change percentage becomes small upstream from said throat, and said blade angle increase percentage becomes large in the flow direction downstream from said throat."

In contrast to this, patent claims 2-3 at the time of application had the same description, and both directly or indirectly cite patent claim 1, so they assumed the constitution "the blade angle from tip to hub at the blade front edge is formed to be substantially equal to the inlet flow angle in the design point flow rate" in patent claim 1.

The inducer of patent claims 1-2 in the amendment submitted with the letter dated March 3, 2004, lacks the constitution:

"The blade angle from tip to hub at the blade front edge is formed to be substantially equal to the inlet flow angle in the design point flow rate"

But the disclosure at the time of application, in both cases, assumed:

"The blade angle from tip to hub at the blade front edge is formed to be substantially equal to the inlet flow angle in the design point flow rate."

There is no description of an invention that does not have this constitution.

That is, the disclosure at the time of application assumed suppression of back flow at the inducer inlet caused by the aforesaid constitution, that is, reduction in drop in static pressure of the negative pressure surface at the blade front edge; for example, if back flow occurred at the inducer inlet the static pressure of the negative pressure surface and the static pressure of the pressure surface would be very different; there is no description regarding what sort of operation or effect could be expected from the constitution of the aforesaid patent claims 1 and 3 in the amendment.

Therefore patent claims 1-2 in the amendment submitted with the letter dated March 3, 2004, exceed the scope of disclosure of the international application at the time of application.